

## ABSTRACT

Vertical electromagnetic stirring is used to produce low shear, stress, turbulent and chaotic mixing of a liquid material or suspension in a container regardless of the volume or container geometry. Movement of a magnetic stir bar is controlled by multiple magnetic fields. The magnetic fields are produced by a series of sequentially or non- sequentially activated inductor coils which produce asymmetrical stirring dynamics and random motions of the stir bar, causing the liquid material to be gently and effectively mixed throughout the container. Moving the stir bar in random and irregular patterns during the stirring operation creates turbulent and chaotic mixing dynamics. The stir bars used for supporting vertical magnetic stirring are specifically designed to optimize the effectivity of the mixing process by maximizing the length of the stir bar to quickly and gently mix the materials.